DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

TO ACCOMPANY
WRIR 83-4121-F

MAP SHOWING OUTCROPS OF BASALTIC ROCKS, BASIN AND RANGE PROVINCE AND VICINITY, TRANS-PECOS TEXAS

Compiled by Christopher D. Henry and Gail L. Fisher,
Texas Bureau of Economic Geology

INTRODUCTION

This map report is one of a series of geologic and hydrologic maps covering all or parts of the States within the Basin and Range province of the western United States, resulting from work under the U.S. Geological Survey's program for geologic and hydrologic evaluation of the Basin and Range province to identify potentially suitable regions for future study relative to isolation of high-level nuclear waste (Bedinger, Sargent, and Reed, 1984).

This map report on the basaltic rocks of Trans-Pecos Texas was prepared from published maps and reports and from field studies in progress by geologists of the Texas Bureau of Economic Geology, and was compiled utilizing the project guidelines of Sargent and Bedinger (1984). The map shows the outcrops and localities of measured thicknesses of the principal basaltic lava flows in the area. A few Precambrian basalts in the Allamoore Formation near Van Horn (King and Flawn, 1953) and the Mundy Breccia in the Franklin Mountains at El Paso (Harbour, 1972) are not shown on the map, as well as a few very thin basalts of limited distribution in various mountain ranges.

The basalts, as well as the other igneous rocks, of the Trans-Pecos area are alkalic (Barker, 1979), and most could more properly be termed hawaiite and mugearite. The basalts were extruded largely during the major period of volcanism in the Trans-Pecos area during the Oligocene from 38 to 28 million years ago (Henry and McDowell, 1982).

In the Description of Map Units, the general map location, geologic name, isotopic age, if available, a brief discussion, and the reference sources of each geologic map unit are discussed. The nomenclature of the geologic units is from published reports and does not necessarily conform to U.S. Geological Survey usage.

DESCRIPTION OF MAP UNITS
[To convert meters (m) to feet, multiply by 3.281]

Map symbol	Location: Map sheet and county	Geologic unit	Isotopic age in millions of years (m.y.)	Comments	References
Tr	Map sheet 2, Presidio and Brewster Counties	Rawls Formation	22 to 23, and 27 to 28 m.y. (McDowell, 1979)	Alkalic mafic to intermediate lava flows, and minor other types of rocks from complex stratovolcano; aggregate thickness 375 m.	Dietrich, 1965; Erickson, 1953; McDowell, 1979; McKnight, 1969
Tm4	Map sheet 2, Presidio County	Morita Ranch Formation, unit 4	32 to 35 m.y.	Many thin lava flows. Overlies an ash-flow tuff dated at 35 m.y.	Cepeda and Henry, 1983; Dietrich, 1965; Hardisty, 1982; Rix, 1953
Tm2	Map sheet 2, Presidio County	Morita Ranch Formation, unit 2	>35 m.y.	Many thin lava flows. Underlies an ash-flow dated at 35 m.y.	Cepeda and Henry, 1983; Dietrich, 1965; Rix, 1953
Tm1	Map sheet 2, Presidio County	Morita Ranch Formation, unit 1	>35 m.y.	Several lava flows. Unit underlies ash-flow tuff dated at 35 m.y.	Cepeda and Henry, 1983; Dietrich, 1965; Rix, 1953
Tpe	Map sheet 1, Jeff Davis and Culberson Counties	Petan Trachyte	<35 m.y.	The Petan is described as a dark-gray, vesicular, porphyritic, fine-grained, plagioclase trachyte in its type area (Amsbury, 1958), but was called a basalt on the various maps covering the Trans-Pecos area of the Geologic Atlas of Texas, (Barnes, 1979a, 1979b, 1982). Field observations by C. D. Henry, Texas Bureau of Economic Geology, indicate the distribution of the Petan of basaltic composition is much less than shown on those maps. On the southern flanks of the Davis Mountains the Petan probably include the Jones Formation (Anderson, 1968).	Amsbury, 1958; Anderson, 1968; Barnes, 1979a, 1979b, 1982

Tbmb	Map sheet 2, Brewster and Presidio Counties	Chisos Formation, Bee Mountain Basalt Member	>34 m.y.	Member consists of many thin lava flows in middle of Chisos Formation. Is older than the Mule Ear Tuff Member dated at 34 m.y.	Maxwell and others, 1967
Tasb	Map sheet 2, Brewster County	Chisos Formation, Ash Spring Basalt Member	>34 m.y.	Composed of two or more lava flows in lower part of Chisos Formation.	Maxwell and others, 1967
Tacb	Map sheet 2, Brewster County	Chisos Formation, Alamo Creek Member	40 to 45 m.y. (Maxwell others, 1967)	Several lava flows in basal part of Chisos Formation.	Maxwell and others, 1967; Stewart, 1982
Te	Map sheet 2, Brewster County	Extrusive basalt of St. John (1966)	22 to 23 m.y. (F. W. McDowell, University of Texas, Austin, unpublished data)	Basalt composed of a lower dark-gray unit and a upper reddish-brown unit, both comprised of several lava flows. Occurs as isolated remnants in Basin and Range fault blocks. Maximum thickness about 137 m (Wilson, 1951).	St. John, 1966; Wilson, 1951
Tcb	Map sheets 1 and 2, Brewster, Jeff Davis, and Presidio Counties	Cottonwood Spring Basalt	36 to 38 m.y.	Several basalt flows.	Goldrich and Elms, 1949; McAnulty, 1955
Tps	Map sheets 1 and 2, Brewster County	Sheep Canyon Basalt	36 to 38 m.y.	Several lava flows which probably came from source in Alpine area.	Goldrich and Elms, 1949; McAnulty, 1955

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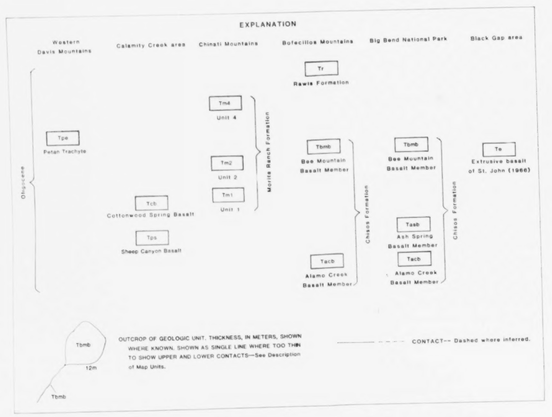
WATER-RESOURCES INVESTIGATIONS REPORT 83-4121-F
SHEET 1 OF 2

MAP SHOWING LOCATION OF TRANS-PECOS TEXAS
AREA WITHIN BASIN AND RANGE PROVINCE



BOUNDARY OF STUDY AREA
DAVIS MOUNTAINS
SIERRA VIEJA
BOUNDARY OF STUDY AREA
Base maps by U.S. Geological Survey: Marfa sheet, 1975; Fort Stockton sheet, 1973

MAP SHOWING OUTCROPS OF BASALTIC ROCKS, BASIN AND RANGE PROVINCE AND VICINITY, TRANS-PECOS TEXAS

Compiled by

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MAP SHOWING LOCATION OF MAP SHEETS COVERING
TRANS-PECOS TEXAS AREA

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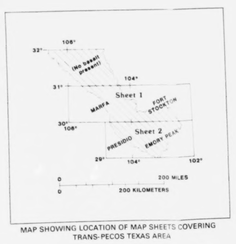
WATER-RESOURCES INVESTIGATIONS REPORT 83-4121-F
SHEET 2 OF 2

MAP SHOWING LOCATION OF TRANS-PECOS TEXAS AREA WITHIN BASIN AND RANGE PROVINCE



MAP SHOWING LOCATION OF MAP SHEETS COVERING TRANS-PECOS TEXAS AREA

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EXPLANATION

Western Davis Mountains | Calamity Creek area | Chinati Mountains | Bofecillos Mountains | Big Bend National Park | Black Gap area

Tpe — Pelton Trachyte

Tcb — Cottonwood Spring Basalt

Tps — Sheep Canyon Basalt

Tr — Rawls Formation

Tmd — Unit 4

Tm2 — Unit 2

Tm1 — Unit 1

Mitchell Mesa Formation

Tbmb — Bee Mountain Basalt Member

Tash — Ash Spring Basalt Member

Tatb — Alamo Creek Basalt Member

Chisos Formation

Tv — Extrusive basalt of St. John (1962)

Oligocene

Tbmb / 12m — OUTCROP OF GEOLOGIC UNIT. THICKNESS, IN METERS, SHOWN WHERE KNOWN. SHOWN AS SINGLE LINE WHERE TOO THIN TO SHOW UPPER AND LOWER CONTACTS. See Description of Map Units.

CONTACT—Dashed where inferred

Outcrops from Barnes (1979b), and from field mapping by U.S. Geological Survey Big Bend project (1979-84)

Base maps from U.S. Geological Survey: Presidio sheet, 1969; Emory Peak sheet, 1977